

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H04L 29/06		A1	(11) International Publication Number: WO 98/16045
			(43) International Publication Date: 16 April 1998 (16.04.98)
(21) International Application Number: PCT/IL97/00320		(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model); EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 30 September 1997 (30.09.97)			
(30) Priority Data: 119364 6 October 1996 (06.10.96) IL			
(71) Applicant (for all designated States except US): MIRABILIS LTD. [IL/IL]; Kehillat Saloniki Street 9, 69513 Tel Aviv (IL).			
(72) Inventors; and			
(75) Inventors/Applicants (for US only): GOLDFINGER, Yair [-IL]; Shoham Street 5, Zahala, 69359 Tel Aviv (IL). VIGISER, Sefi [IL/IL]; Ha'vered Street 15, 45205 Hod Hasharon (IL). VARDI, Arieh [IL/IL]; Shamir Street 12, 69693 Ramat Aviv (IL). AMNON, Amir [IL/IL]; Keilat Zion Street 42, 46382 Herzelia (IL).			
(74) Agents: COLB, Sanford, T. et al.; Sanford T. Colb & Co., P.O. Box 2273, 76122 Rehovot (IL).			
<p>Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> </p>			
<p>(54) Title: COMMUNICATIONS SYSTEM</p>			
<p>(57) Abstract</p> <p>The present invention discloses a communication system including a communications network, a multiplicity of communications terminals which are connectable to the communications network and which can be employed by users to communicate via the communications network, the user not necessarily being identified with a given communications terminal; apparatus for monitoring whether or not a user is connected to the communications network irrespective of which of the multiplicity of communications terminals that user is employing, and apparatus for annunciating to a seeking user, currently connected to the communications network via any of the multiplicity of communications terminals, network connection status information relating to other users who are in a set of sought users, which set is definable by the seeking user, and for providing the seeking user connection address information relating to those sought users who are currently connected to the communications network.</p>			

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

COMMUNICATIONS SYSTEM

FIELD OF THE INVENTION

5 The present invention relates to communications systems generally and particularly to network communications systems.

BACKGROUND OF THE INVENTION

Establishing a point-to-point connection between 10 users who are connected via communications terminals to a communications network generally requires that the network address of each connecting user be known to all other connecting users. Many network communications service providers, such as Internet Service Providers (ISP's), assign 15 users a different network address, such as an IP address, each time they connect to the network, making foreknowledge of a particular user's network address impossible.

Some commercial and non-commercial services maintain network servers connected to a network. Users who connect to 20 the network provide their current network address and other identifying information to one or more of these network servers. This information is made available to other users connected to the network for purposes including point-to-point communications. Such services include Internet Relay Chat 25 (IRC), for which software is commercially available from Surfing Squirrel Productions, Inc., Microsoft User Location Service (ULS), commercially available from Microsoft Corporation, and the Automatic Call Distribution System (ACD), commercially available from Executone Information Systems, Inc.

30 A user wishing to locate another user may connect to a network server that records user information in order to determine the other user's network address. A user usually locates another user by looking for the other user's electronic mail address, one or more nicknames that the other user often uses, or other identifying information. The effective use of 35

such identifying information is limited inasmuch as a single user might have multiple electronic mail addresses, multiple users might use the same nickname, or a user might be connected via another user's network connection.

Unfortunately, services like those mentioned above do not generally provide for the unique identification of each user, thereby facilitating accurate location a specific user. Furthermore, such services require that users actively seek out other users, often from among several hundreds or thousands of users known to a server to be connected to a network at any given time. Such services also do not enable a user to limit who may access that user's identification information.

SUMMARY OF THE INVENTION

The present invention seeks to provide an improved communications system for facilitating locating a user who is connected to a communications network, preferably for the purposes of establishing point-to-point communications. A user's location on a communications network is typically expressed in terms of the user's current network address.

The communications system of the present invention preferably provides at least some and preferably all of the following advantages:

- a. Users may be located accurately, because each user has a permanent and unique identification code.
- b. Users may be located quickly and efficiently, because the network server automatically provides a user who is currently connected to the network with a list of other users who are currently connected to the network from among a predefined list of users whose connection status the user wishes to know.
- c. Users are notified automatically when another user, in whom the seeking user has interest, connects to the network.
- d. Users may protect their privacy by limiting who may locate them.

It is noted that throughout the specification and claims the term "user" encompasses any entity, preferably human, that operates a computer or other communications terminal, preferably for the purpose of connecting to and communicating via a communications network. It is further noted that the term "seeking user" encompasses any user who wishes to locate at least one other user currently connected to the communications network. It is further noted that the term "sought user" encompasses any user whose location, typically a network address, is desired by a seeking user.

There is thus provided in accordance with a preferred embodiment of the present invention a communication system including a communications network, a multiplicity of communications terminals which are connectable to the communications network and which can be employed by users to communicate via the communications network, the user not necessarily being identified with a given communications terminal, apparatus for monitoring whether or not a user is connected to the communications network irrespective of which of the multiplicity of communications terminals that user is employing, and apparatus for annunciating to a seeking user, currently connected to the communications network via any of the multiplicity of communications terminals, network connection status information relating to other users who are in a set of sought users, which set is definable by the seeking user, and for providing the seeking user connection address information relating to those sought users who are currently connected to the communications network.

Further in accordance with a preferred embodiment of the present invention, any of the users may function as at least one of a seeking user and a sought user.

Still further in accordance with a preferred embodiment of the present invention, any of the users may function simultaneously as a seeking user and a sought user.

Further in accordance with a preferred embodiment of the present invention, the network connection status information includes an indication that a sought user is currently connected to the communications network.

5 Additionally in accordance with a preferred embodiment of the present invention, the network connection status information includes an indication that a sought user has currently become connected to the communications network.

10 Moreover in accordance with a preferred embodiment of the present invention, the network connection status information includes an indication that a sought user has currently become disconnected from the communications network.

15 Further in accordance with a preferred embodiment of the present invention, at least one of the users has a unique identification code.

Still further in accordance with a preferred embodiment of the present invention, the unique identification code is independent of any communications terminal.

20 Additionally in accordance with a preferred embodiment of the present invention, at least one server is connected to the communications network, and the apparatus for monitoring is resident in the at least one server.

25 Further in accordance with a preferred embodiment of the present invention, at least one server is connected to the communications network, and the apparatus for annunciating is resident in the at least one server.

30 Moreover in accordance with a preferred embodiment of the present invention, the communications system includes apparatus for notifying at least once that at least one of the users is currently connected to the communications network.

Further in accordance with a preferred embodiment of the present invention, the apparatus for notifying is resident in any of the multiplicity of communications terminals.

35 Still further in accordance with a preferred embodiment of the present invention, at least one of the users

is currently connected to the communications network and has a network address, and the communications system includes apparatus for determining the network address.

5 Additionally in accordance with a preferred embodiment of the present invention, at least one server is connected to the communications network, and the apparatus for determining is resident in the at least one server.

10 Moreover in accordance with a preferred embodiment of the present invention, the apparatus for determining is resident in any of the multiplicity of communications terminals.

15 Further in accordance with a preferred embodiment of the present invention, the communication system includes apparatus for authorizing whether the at least one seeking user may access any of the information relating to the sought users.

Still further in accordance with a preferred embodiment of the present invention, the apparatus for authorizing is resident in any of the multiplicity of communications terminals.

20 Additionally in accordance with a preferred embodiment of the present invention, the communication system includes apparatus for maintaining information regarding any of the users.

25 Moreover in accordance with a preferred embodiment of the present invention, the apparatus for maintaining information is resident in at least one server connected to the communications network.

30 Further in accordance with a preferred embodiment of the present invention, at least one of the users provides information to the apparatus for maintaining information.

Still further in accordance with a preferred embodiment of the present invention, the information includes the set of sought users.

35 Additionally in accordance with a preferred embodiment of the present invention, the information comprises

a request from a sought user to authorize whether a seeking user may access any of the information relating to the sought user.

There is also provided in accordance with a preferred embodiment of the present invention a method for indicating network connection information relating to users, the method including monitoring whether or not a user is connected to a communications network via any of a multiplicity of communications terminals, and annunciating to a seeking user, currently connected to the communications network via any of the multiplicity of communications terminals, network connection status information relating to other users who are in a set of sought users, which set is definable by the seeking user, and for providing the seeking user connection address information relating to those sought users who are currently connected to the communications network.

Further in accordance with a preferred embodiment of the present invention, at least one of the users has a unique identification code.

Still further in accordance with a preferred embodiment of the present invention, the unique identification code is independent of any communications terminal.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description, taken in conjunction with the drawings in which:

Fig. 1 is a simplified pictorial illustration of a communications system constructed and operative in accordance with a preferred embodiment of the present invention, wherein a user is connecting to a communications network via a communications terminal and user information is provided to a server connected to the communications network.

Fig. 2 is a simplified pictorial illustration of a communications system constructed and operative in accordance with a preferred embodiment of the present invention, wherein a

sought user is connecting to the communications network of Fig. 1, information identifying the sought user is provided to the server of Fig. 1, and wherein the server of Fig. 1 communicates information identifying the sought user to the user of Fig. 1.

5 Fig. 3 is a simplified pictorial illustration of a communications system constructed and operative in accordance with a preferred embodiment of the present invention, wherein the user of Fig. 1 communicates directly with the sought user of Fig. 2, having received the sought user's network address.

10 DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Reference is now made to Fig. 1 which is a simplified pictorial illustration of a communications system 10 constructed and operative in accordance with a preferred embodiment of the present invention.

15 Communications system 10 preferably includes a multiplicity of communications terminals 12 connectable to a communications network 14 via a multiplicity of connection media 16, which may either be wired or wireless. Communications terminals 12 are preferably operative to receive 20 inputs from and display information to a user 18, and to transmit and receive information via communications network 14 to and from at least one server 20 that is also connected to communications network 14 via connection media 16. Server 20 is likewise operative to send and receive information via 25 communications network 14.

Connection notification apparatus 30 is operative to receive input from communications terminal 12, in which connection notification apparatus 30 is typically resident. Communications terminal 12 signals connection notification 30 apparatus 30 when communications terminal 12 connects to communications network 14. Connection notification apparatus 30 preferably transmits notification via communications network 14 to a connection monitor 22, which is operative to receive input via communications network 14, and which is typically 35 resident in server 20. An address extractor 26, typically

resident in server 20, is operative to determine the source network address of the notification received by connection monitor 22, to which address extractor 26 is operatively interconnected. Address extractor 26 is operative to provide the network address to information management apparatus 28, typically resident in server 20, where the address is maintained. Address extractor 26 is alternatively or additionally operative to communicate with communications terminal 12, in which address extractor 26 may alternatively or 10 additionally reside, where address extractor 26 is operative to determine the network address of connection terminal 12 when a connection to communications network 14 is established, and to provide the network address to connection notification apparatus 30.

15 An annunciator 24, typically resident in server 20, is operative to receive information maintained by information management apparatus 28 and transmit this information to communications terminal 12.

20 Typical operation of communications system 10 is described in detail below with reference to Figs. 1, 2, and 3.

Reference is now made to Fig. 1 which shows a user 18 establishing a connection to communications network 14, typically the Internet, using a communications terminal 12 via connection medium 16. The connection to communications network 25 14 is typically via a leased line or dial-up line to a network communications service provider, typically an Internet Service Provider (ISP).

At least one server 20 is typically continually connected to the communications network 14 via connection 30 medium 16. More than one server 20 may be provided wherein all servers are preferably continually synchronized to maintain and supply the same information.

Once user 18 is connected to communications network 14, connection notification apparatus 30 notifies connection 35 monitor 22 that user 18 is connected to communications network

14. This notification preferably includes a unique identification code predefined for user 18 and maintained in a list of connected users by information management apparatus 28. This unique identification code is preferably independent of the communications terminal 12 used by user 18. Preferably, this notification also comprises a user password for authentication of the unique identification code. This notification may also include other information such as the current network address for user 18.

10 Address extractor 26 preferably determines the current network address of user 18 when the user is connected to communications terminal 12. Address extractor 26 is preferably operative to extract a network address from transmission packets used in network data transmission
15 protocols such as TCP/IP. Thus address extractor 26 may extract the current network address of user 18 from transmission packets sent by connection notification apparatus 30 to connection monitor 22. Address extractor 26 then provides the current network address for user 18 to information
20 management apparatus 28 which maintains the address in the list of connected users.

While address extractor 26 typically communicates with information management apparatus 28 as mentioned above, address extractor 26 may alternatively or additionally
25 communicate with communications terminal 12, providing the current network address to connection notification apparatus 30. Connection notification apparatus then transmits the network address to connection monitor 22, which provides the address to information management apparatus 28 which maintains
30 the address in the list of connected users.

Communications terminal 12 preferably provides a list of sought users predefined by user 18 to information management apparatus 28 which maintains it. Communications terminal 12 may also provide instructions from user 18 to information
35 management apparatus 28 regarding whether user 18 requests to

be asked to explicitly authorize whether to reveal information relating to user 18 to a seeking user who requests this information. Information management apparatus 28 maintains a list of users who request to be asked for authorization.

5 Information management apparatus 28, upon receipt of a list of sought users from user 18 at communications terminal 12, checks the list of connected users for any sought users that are currently connected to communications network 14, typically for display on the terminal. If connected sought
10 users are found, information management apparatus 28 causes annunciator 24 to transmit an annunciation to user 18 at communications terminal 12 wherein the annunciation typically includes the unique identification codes and network addresses for all users who are currently connected to communications
15 network 14 and who user 18 is seeking.

Connection monitor 22 periodically polls communications terminal 12 or otherwise determines if communications terminal 12 is still connected to communications network 14 in accordance with network communications protocols
20 well known in the art, such as TCP/IP. Alternatively or additionally, connection notification apparatus 30 periodically notifies connection monitor 22 that communications terminal 12 is still connected to communications network 14 in accordance with network communications protocols well known in the art,
25 such as TCP/IP.

Reference is now made to Fig. 2 which shows a user 34 establishing a connection to communications network 14 preferably in the same manner as described for user 18 in Fig.
1. Once user 34 is connected, information management apparatus
30 28 checks the list of sought users to determine if user 34 is sought by user 18. If so, information management apparatus 28 then checks the list of connected users to determine if user 18 is still connected. If user 18 is still connected, information management apparatus 28 causes annunciator 24 to transmit an
35 annunciation to user 18, wherein the annunciation typically

includes the unique identification code for sought user 34, the current network address for sought user 34, and preferably other information provided by user 18. Information management apparatus 28 preferably also checks the list of sought users to determine if user 18 is sought by user 34 and, if so, causes annunciator 24 to transmit an annunciation to user 34 as described above.

According to another embodiment of the present invention information management apparatus 28 checks the list of users who wish to be asked for authorization to determine if user 34 wishes to explicitly authorize requests from seeking users for information regarding user 34. If explicit authorization is required from user 34, annunciator 24 transmits a request for authorization to authorization apparatus 36, typically resident in communications terminal 12. User 34 authorizes or declines the request from user 18 for location or other information relating to user 34. Authorization apparatus 36 then provides the authorization information to information management apparatus 28 which determines whether to cause annunciator 24 to transmit an annunciation to user 18.

Reference is now made to Fig. 3 which shows user 18 making a point-to-point connection with sought user 34 using the network address of sought user 34 as provided by annunciator 24 as described above with reference to Figs. 1 and 2. It is appreciated that user 18 may establish a point-to-point connection with user 34 once user 18 possesses the network address of user 34 independent of the present invention.

It is appreciated that any of the software components of the present invention may, if desired, be implemented in ROM (read-only memory) form. The software components may, generally, be implemented in hardware, if desired, using conventional techniques.

It is appreciated that various features of the invention which are, for clarity, described in the context of separate embodiments may also be provided in combination in a single embodiment. Conversely, various features of the invention which are, for brevity, described in the context of a single embodiment may also be provided separately or in any suitable combination.

It will be appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and described hereinabove. Rather the scope of the present invention is defined only by the claims which follow:

CLAIMS

1. A communications system comprising:
 - a communications network;
 - 5 a multiplicity of communications terminals which are connectable to said communications network and which can be employed by users to communicate via said communications network, wherein a user is not necessarily identified with a given communications terminal;
- 10 apparatus for monitoring whether or not a user is connected to said communications network irrespective of which of said multiplicity of communications terminals that user is employing; and
 - apparatus for annunciating to a seeking user, 15 currently connected to said communications network via any of said multiplicity of communications terminals, network connection status information relating to other users who are in a set of sought users, which set is definable by said seeking user, and for providing to said seeking user connection 20 address information relating to those sought users who are currently connected to said communications network.
2. A communications system according to claim 1 and wherein any of said users may function as at least one of a seeking user and a sought user.
- 25 3. A communications system according to claim 1 and wherein any of said users may function simultaneously as a seeking user and a sought user.
4. A communications system according to claim 1 and wherein said network connection status information includes an 30 indication that a sought user is currently connected to the communications network.
5. A communications system according to claim 1 and wherein said network connection status information includes an indication that a sought user has currently become connected to 35 the communications network.

6. A communications system according to claim 1 and wherein said network connection status information includes an indication that a sought user has currently become disconnected from the communications network.

5 7. A communications system according to claim 1 and wherein at least one of said users has a unique identification code.

8. A communications system according to claim 7 and wherein said unique identification code is independent of any 10 communications terminal.

9. A communications system according to claim 1 wherein at least one server is connected to said communications network and wherein said apparatus for monitoring is resident in said at least one server.

15 10. A communications system according to claim 1 wherein at least one server is connected to said communications network and wherein said apparatus for annunciating is resident in said at least one server.

11. A communications system according to claim 1 and 20 comprising apparatus for notifying at least once that at least one of said users is currently connected to said communications network.

12. A communications system according to claim 11 and wherein said apparatus for notifying is resident in any of said 25 multiplicity of communications terminals.

13. A communications system according to claim 1 wherein at least one of said users is currently connected to said communications network and has a network address, and comprising apparatus for determining said network address.

30 14. A communications system according to claim 13 wherein at least one server is connected to said communications network and wherein said apparatus for determining is resident in said at least one server.

15. A communications system according to claim 13 and wherein said apparatus for determining is resident in any of said multiplicity of communications terminals.

16. A communications system according to claim 1 and comprising apparatus for authorizing whether said at least one seeking user may access any of said information relating to said sought users.

17. A communications system according to claim 16 and wherein said apparatus for authorizing is resident in any of 10 said multiplicity of communications terminals.

18. A communications system according to claim 1 and comprising apparatus for maintaining information regarding any of said users.

19. A communications system according to claim 18 and 15 wherein said apparatus for maintaining information is resident in at least one server connected to said communications network.

20. A communications system according to claim 18 and wherein at least one of said users provides information to said 20 apparatus for maintaining information.

21. A communications system according to claim 18 and wherein said information comprises said set of sought users.

22. A communications system according to claim 18 and 25 wherein said information comprises a request from a sought user to authorize whether a seeking user may access any of said information relating to said sought user.

A communications system according to claim 1 and wherein said communications network is configured to allow a first user from among any of said users to establish a point-to-point connection with a second user from among any of said users if said first user possesses said connection address information relating to said second user.

23. A method for indicating network connection information relating to users, the method comprising:

monitoring whether or not a user is connected to a communications network via any of a multiplicity of communications terminals irrespective of which of said multiplicity of communications terminals that user is employing;

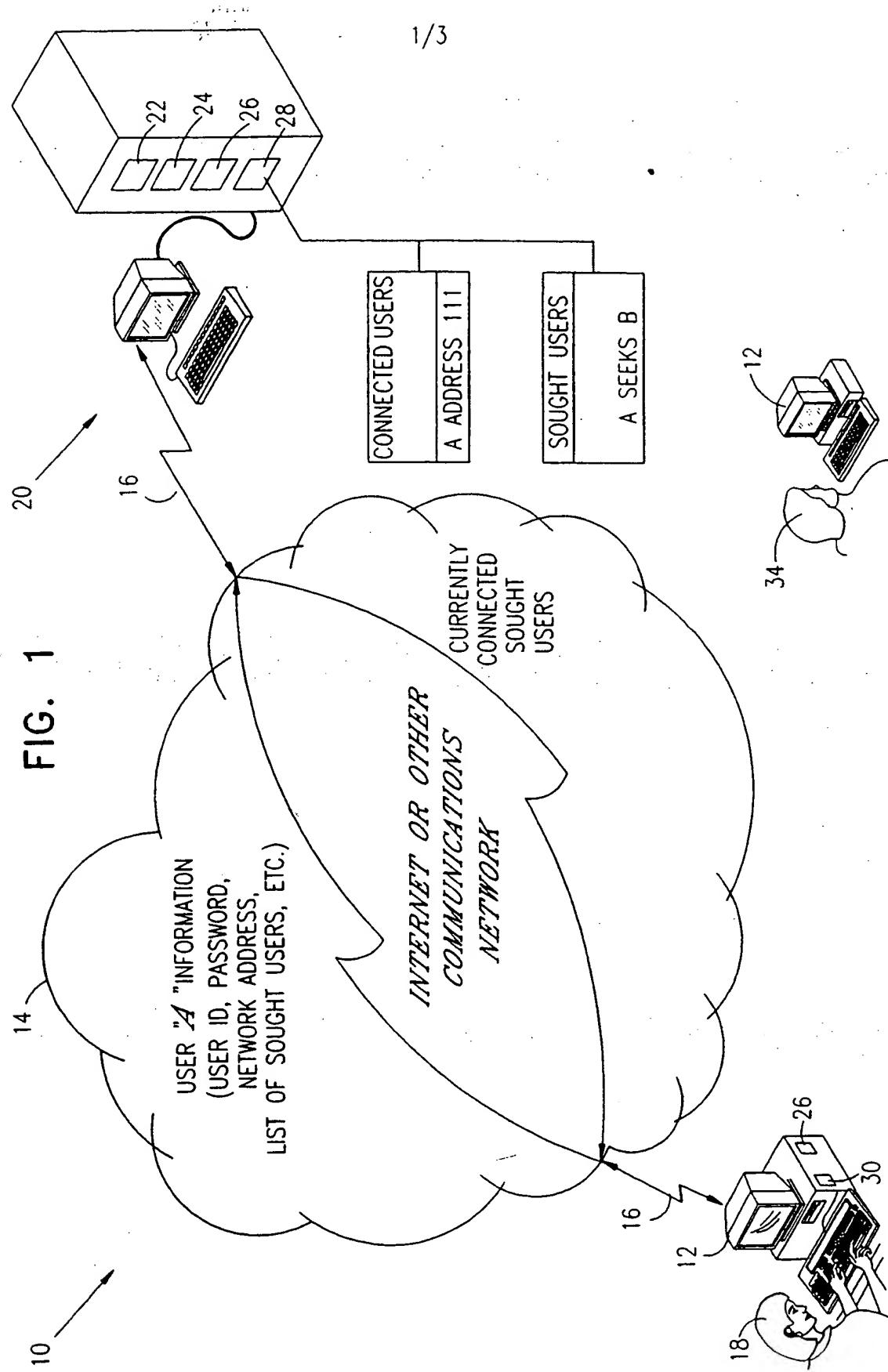
annunciating to a seeking user, currently connected to said communications network via any of said multiplicity of communications terminals, network connection status information relating to other users who are in a set of sought users, which 10 set is definable by said seeking user; and

providing to said seeking user connection address information relating to those sought users who are currently connected to said communications network.

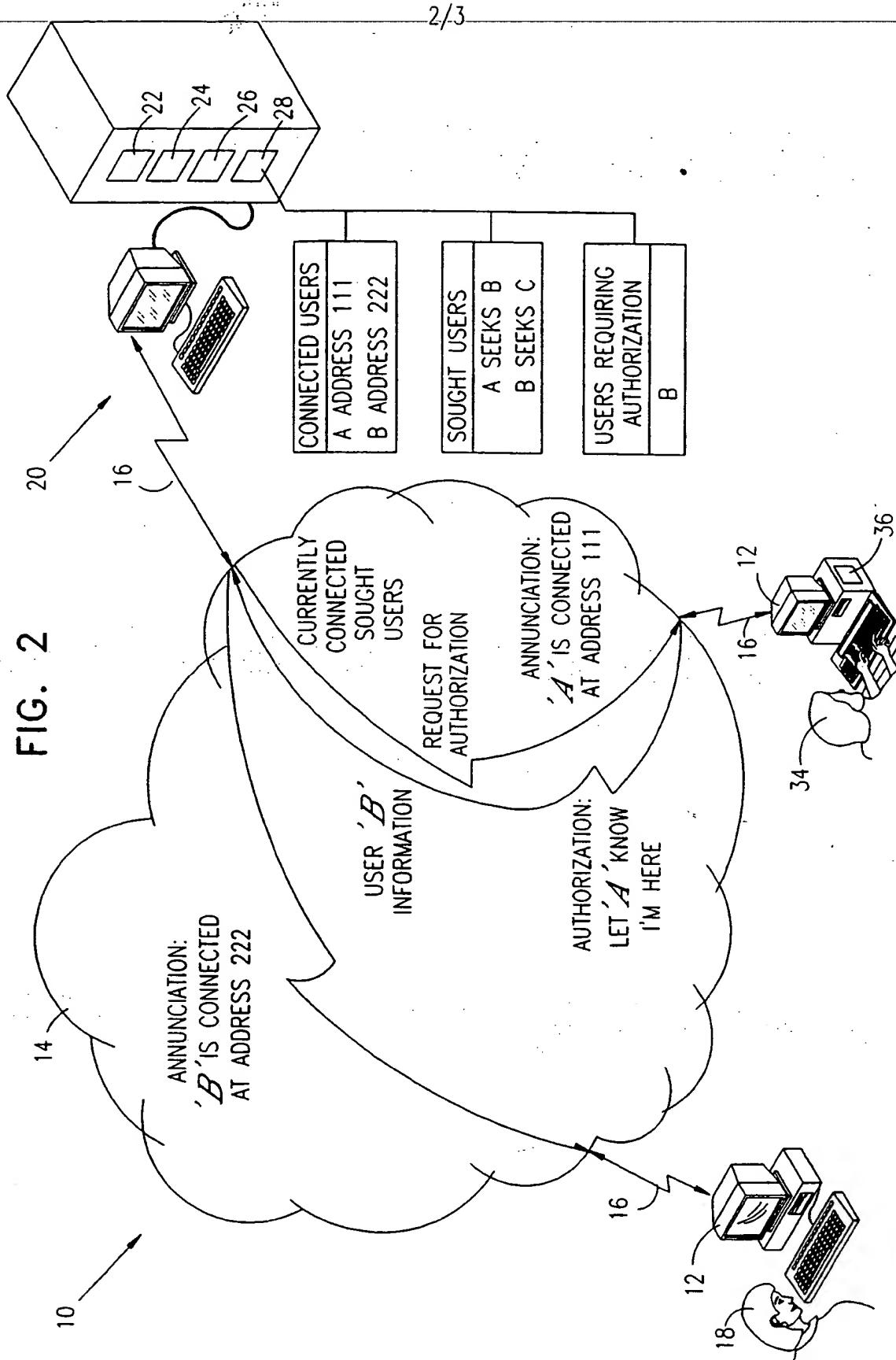
24. A method according to claim 23 wherein at least one 15 of said users has a unique identification code.

25. A method according to claim 24 wherein said unique identification code is independent of any communications terminal.

1/3

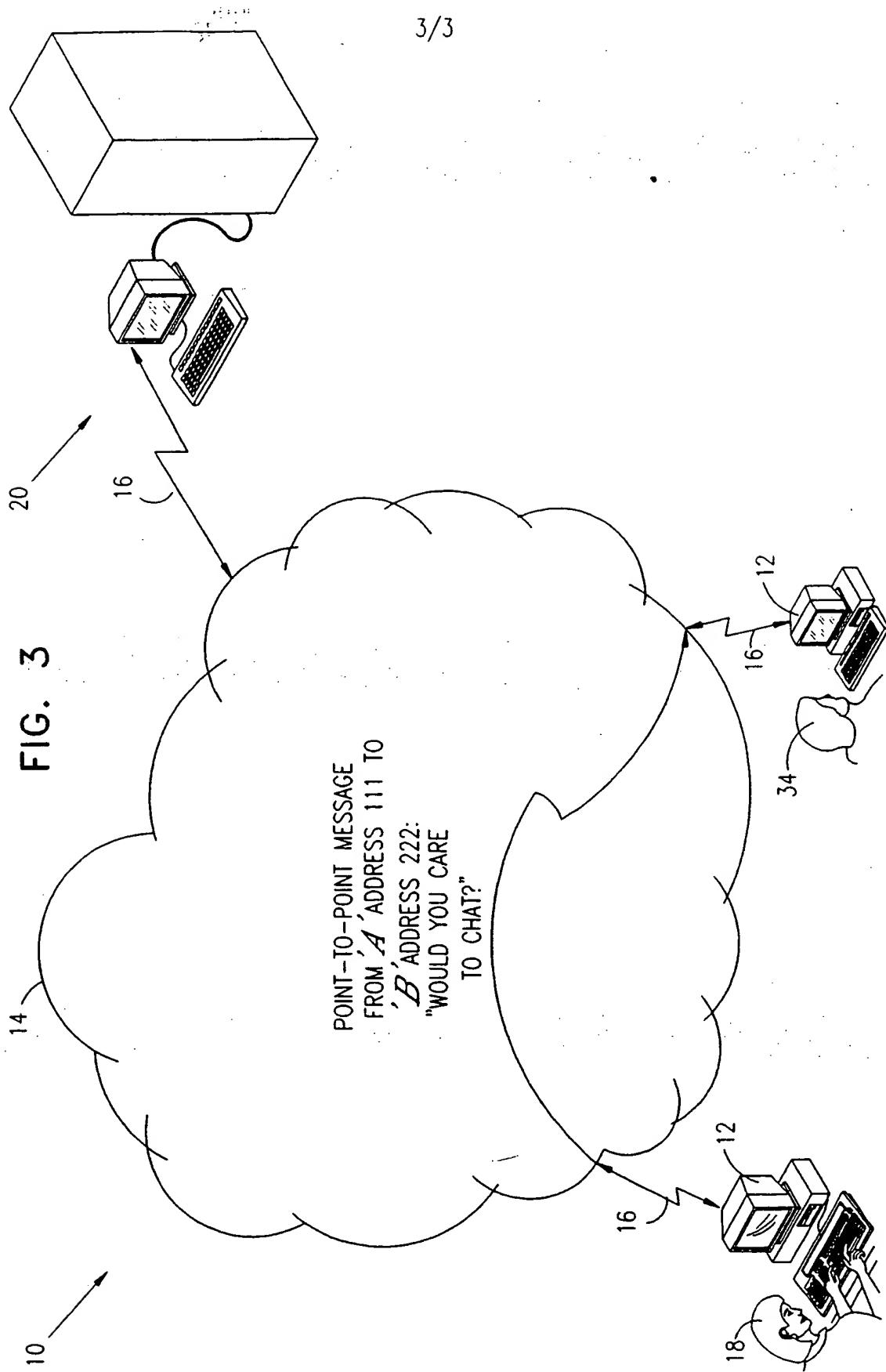


2/3



3/3

FIG. 3



INTERNATIONAL SEARCH REPORT

International Application No
PCT/IL 97/00320

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04L29/06

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04L H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MULLER N: "DIAL 1-800-INTERNET WITH NEW SOFTWARE, YOU CAN TALK BUSINESS OVER THE NET AND AVOID LONG-DISTANCE CHARGES" BYTE, vol. 21, no. 2, 1 February 1996, page 83/84, 86, 88 XP000566097 see page 83, right-hand column, line 31 - line 39 see page 84, middle column, line 7 - line 25 see figure 1	1-25
A	WAYNER P: "HEY BABY, CALL ME AT MY IP ADDRESS" BYTE, vol. 21, no. 4, 1 April 1996, pages 142-144, XP000586038 see the whole document	1-25

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

2

Date of the actual completion of the international search

Date of mailing of the international search report

13 February 1998

24/02/1998

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax: (+31-70) 340-3016

Authorized officer

Adkhis, F